III. ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION

In accordance with Section 15143 of the CEQA Guidelines, this SEIR focuses on the significant effects on the environment from the proposed helipad project. Effects found to be clearly insignificant in the Initial Study and unlikely to occur need not be further discussed. A copy of the December 2005 Initial Study is attached to this SEIR (refer to Appendix A) to provide the basis for the impacts discussed in the SEIR.

The December 2005 Initial Study identified periodic or temporary noise impacts as a new significant impact. Other effects that would be different than those described in the 1995 Final EIR for the Kaiser Permanente Santa Clara Medical Center Project, such as land use compatibility and aviation hazards, are also discussed.

A. LAND USE

1. Introduction and Regulatory Framework

Land uses in the City of Santa Clara are governed by the goals and policies in the City's General Plan and the City's zoning ordinance in the Municipal Code.

2. Existing Setting

The proposed helipad site is located within the Kaiser Permanente Santa Clara Medical Center facility, which is currently under construction. Upon completion in approximately mid-2007, the medical center will include an approximately 710,000 square foot hospital and 520,000 square feet of medical office uses.

Surrounding Land Uses

Multi-family, single-family, and commercial buildings are present to the north of Homestead Road and a shopping center and residences are present to the east of Lawrence Expressway. Residences that are suburban in character border the site to the south. Calabazas Creek crosses the medical center campus to the west of the proposed helipad. Tennis courts and a swimming pool in a private recreational facility and multiple story office and industrial buildings are present to the west of the larger medical center site and Calabazas Creek. Surrounding land uses are shown on Figure 3.

Existing Land Use and Zoning Designations

The General Plan land use designation for the site is *Public Facilities, Institutional*. The Public Facilities designation allows for a wide range of institutional, academic, governmental, and community service uses that are publicly or privately owned and operated. The proposed helipad site is located within the approximately 53-acre Kaiser Permanente Santa Clara Medical Center, which is zoned *Planned Development.* The Planned Development zoning allows for construction of a 450-bed hospital, two medical office buildings, and a parking structure.

Site Constraints

Physical conditions on or adjacent to the site which might affect its suitability for use as a helipad include the following:

- The presence of tall (four-story) structures, utility lines and light standards that could be a safety hazard to helicopter landings and take-offs.
- The proximity of the helipad site to residential uses to the north, south, and east.

Obstacles to aircraft, helipad lighting, and marking are discussed in *Section II. B. Aviation Safety.* Noise and its impact on nearby residential uses is specifically discussed in *Section II. C. Noise.*

Existing Air Ambulance Evacuations at the 900 Kiely Boulevard Site

Kaiser Permanente currently operates a 286-bed general, acute care hospital at 900 Kiely Boulevard in the City of Santa Clara. Basic emergency services are provided at this facility.

Currently, emergency helicopter evacuations of patients from the existing Kaiser Permanente hospital facility on Kiely Boulevard occur approximately nine to 13 times per year.[9] Air ambulance helicopters typically approach the Kiely Boulevard facility from the northwest, down Kiely Avenue and then turn west and land on Kaiser Drive. The Santa Clara Police Department assists with each helicopter evacuation by closing these streets to vehicular traffic.

Patients are currently evacuated by helicopter to Stanford University Medical Center for treatment in order to perform two procedures: 1) ECMO (Extra Corporeal Membrane Oxygenation) or use of a heart-lung bypass machine on infants who are suffering from severe heart and lung failure; and 2) aortic dissections when a patient's aorta fails.[10] An average of three to four premature infants are evacuated by helicopter per year for ECMO treatment and an average of six to nine adults are evacuated for aortic dissections per year.

3. Land Use Impacts

Thresholds of Significance

For the purposes of this SEIR, a land use or hazards impact is considered significant if the project will:

- physically divide an established community; or
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

[9] Lee Ann Knight, Senior Project Manager, Kaiser Permanente, personal communications, June 2004 and July 2005, based upon information from hospital medical and security staff and the Santa Clara Police Department.
[10] The aorta is the main artery in the heart.

Land Use Conflicts

Land use conflicts can arise from two basic causes: 1) a new development or land use may cause impacts to persons or the physical environment in the vicinity of the project site or elsewhere; or 2) conditions on or near the project site may have impacts on the persons or development introduced onto the site by the new project. Both of these circumstances are aspects of land use compatibility. Potential incompatibility may arise from placing a particular development or land use at an inappropriate location, or from some aspect of the project's design or scope. Depending on the nature of the impact and its severity, land use compatibility conflict can range from minor irritation and nuisance to potentially significant effects on human health and safety. The discussion below distinguishes between potential impacts from the proposed project upon people and the physical environment, and potential impacts from the project's surroundings upon the project itself.

The analysis in this SEIR evaluates both the basic suitability of the site area for the proposed land use and its compatibility with existing uses in the area. The SEIR looks at the impacts of constructing and operating the helipad measured against existing conditions.

Impacts from the Project

The project proposes issuance of a Use Permit to allow for the construction and operation of an emergency helipad at a new hospital and medical center facility. The edge of the helipad platform is located approximately 285 feet from the closest residential properties to the south[11] and approximately 1,400 feet from residences to the north and 1,500 feet from residences to the east. Residential uses to the north and east are separated from the medical center site by Homestead Road and Lawrence Expressway, respectively.

Once the new Kaiser hospital facility and the proposed helipad are operational, existing occasional helicopter evacuations from the Kaiser Hospital on Kiely Boulevard would shift from landings and takeoffs on Kaiser Drive to the proposed helipad on the Lawrence Expressway site. The location of landings would be shifted approximately 1.2 miles to the southwest. The existing area used for landings is located at street level, several hundred feet from multi-family residences on Kaiser Drive. Helicopter flights typically approach along Kiely Boulevard from the north (refer to Figure 8 in *Section II. B. Aviation Hazards* for flight paths). Relocation of Kaiser Hospital would shift emergency helicopter flight paths to the west. Residential areas are located in proximity to both the existing Kaiser Hospital and the new facility on Lawrence Expressway. Santa Clara High School and Milliken Elementary School are also located near the Kaiser facility on Kiely Boulevard, approximately 0.3 mile to the north and northeast, respectively (refer to Figure 15 in *Section II. C. Noise*). Sutter Elementary is located approximately 0.7 mile to the east of the proposed helipad.

It is not anticipated that the number of helicopter trips to and from the City of Santa Clara would substantially change**.** In the near term, the number of evacuation flights is anticipated to be reduced by approximately two-thirds as adult patients who require aortic dissections would no longer need to be transported to Stanford University Medical Center.

Adjacent residential uses back up to the medical center property on Lawrence Expressway with back or side yards bordered by a six to eight foot tall masonry wall. As the helipad

[11] The center of the helipad, where the helicopters land, is approximately 310 feet from the masonry wall at the edge of the closest residential property.

would be located several hundred feet from residences and would be separated by a relatively tall masonry wall, conflicts such as shade and shadow impacts, loss of privacy, dust stirred up by helicopter rotors, and light spillover from helipad lighting would be avoided. While helicopter landings and takeoffs would be relatively infrequent, a potential land use conflict associated with placing a helipad at this location would include sleep disturbance if a substantial number of flights occurred at nighttime and annoyance at the unique sound signature of helicopter blade "slap" (refer to *Section II. C. Noise* for a discussion of the characteristics of helicopter noise).

- **The proposed separation distance between the proposed helipad and existing residential properties would avoid land use conflicts from shade and shadow impacts, loss of privacy, dust impacts, and light spillover from helipad lighting. (Less Than Significant Impact)**

- **The proposed project could result in annoyance and sleep disturbance from helicopter landings and departures. As discussed in *Section III. C. Noise*, this periodic increase in noise would be a new significant noise impact. (Significant Impact)**

Impacts to the Project

The proposed helipad is elevated to allow for approach and departure paths over four-story parking structures and utility lines. It is also set back from tall trees. Uses on the medical center site and adjacent residential and private recreation properties would not interfere with operation of the helipad or result in land use compatibility impacts to the proposed project.

General Plan and Zoning

The site is designated as *Public Facilities, Institutional* in the City of Santa Clara General Plan. The *Public Facilities* designation allows for a wide range of institutional, academic, governmental, and community service uses that are publicly or privately owned and operated. The proposed use within the larger medical center site is consistent with the land use designation for the site.

The 1995 Final EIR for the Kaiser Permanente Santa Clara Medical Center Replacement Project identified that the general operation of the hospital, including disturbances associated with cars parking, service deliveries, and emergency vehicles, would result in potentially significant land use impacts upon the adjacent residential uses to the south of the medical center site. Mitigation proposed to reduce these potential land use compatibility impacts included installation of landscaping that would screen and soften the visual impacts of the project and use of noise reduction techniques to maintain acceptable noise levels from equipment and parking structures near residential areas.

The 1995 Final EIR for the medical center did not address construction and operation of an emergency helipad. The potential noise impacts of the proposed emergency helipad are discussed in *Section II. C. Noise* of this SEIR. While the operation of a helipad within several hundred feet of residential uses to the south and over 1,475 feet to the east, could result in occasional annoyance associated with helicopter landings and departures, the project would conform to the Design Policies of the Land Use Element and the Noise Policies in the Environmental Quality Element in the City's General Plan that relate to land use compatibility and environmental impacts of new development.

- **The proposed project would not conflict with General Plan policies or regulations of the City of Santa Clara adopted for the purpose of avoiding or mitigating an environmental effect. (Less Than Significant Impact)**

3. Mitigation and Avoidance Measures

The project includes *Noise Mitigation and Avoidance Measures* for periodic noise impacts as listed in *Section III. C. Noise* on pages 51 and 54 of this Draft EIR.

Conditions in the Use Permit for the proposed helipad would limit the types of landings at the site to those of evacuation of critically ill patients where time is of the essence. This would restrict the number of flights and associated temporary increases in noise levels in the vicinity of the proposed helipad. While implementation of the measures listed in *Section III. C. Noise* could avoid or limit annoyance from helicopter flights to an extent, using conservative estimates (the worst-case scenario) the project would result in a significant, unavoidable periodic noise impact to some residential areas east of Lawrence Expressway and south of the proposed helipad.

4. Conclusion

Construction and operation of a private helipad at the new Kaiser Santa Clara Medical Center for emergency patient evacuations would not result in significant land use conflicts from shade and shadow impacts, loss of privacy, dust impacts, and light spillover. The proposed project also would not conflict with General Plan policies or regulations of the City of Santa Clara adopted for the purpose of avoiding or mitigating an environmental effect. **(Less Than Significant Impacts)**

The proposed project could result in a land use conflict due to periodic annoyance and sleep disturbance from helicopter landings and departures that occur during nighttime hours. As described in Section III. C. Noise, since the timing and frequency of helicopter operations is a function of when non-scheduled (emergency) evacuations are required, and under the worst-case scenario a significant periodic noise impact could occur in the future, the project would result in significant and unavoidable periodic noise annoyance from new emergency helicopter operations. **(Significant Unavoidable Impact)**

B. AVIATION HAZARDS

Portions of this section were prepared based upon information provided by *Heliplanners, Aviation Planning Consultants -- Heliport Specialists.*

1. Introduction and Regulatory Framework

The Federal Aviation Administration (FAA) regulates the safety of civil aviation and the FAA's Advisory Circular on Heliport Design (Advisory Circular 150/5390-2A), provides the basic standards used to design heliports and helipads in the United States. In these heliport design standards, an acceptable final approach and takeoff area (FATO) and safety areas are defined. These areas must be maintained clear of obstructions extending above landing pad elevations. The FAA also provides standards for the placement of windsocks, heliport beacons, and heliport markings.

The California Department of Transportation (Caltrans), Division of Aeronautics issues permits for heliports in the State of California. Heliports must meet FAA FATO standards and other criteria prior to obtaining a Caltrans Heliport Permit. Regulations for a State permitted heliport, based on the established heliport safety standards in FAA's Heliport Design guidelines, are intended for regular medical helicopter operations at large facilities in urban settings.

2. Existing Setting

The project site is located east of Calabazas Creek within the new Kaiser Permanente Santa Clara Medical Center on Lawrence Expressway at Homestead Road. The medical center, including a 450-bed hospital, is currently under construction. Hospital buildings, located just east of Calabazas Creek, are four stories in height. Two four-level parking structures are located in the southwest corner of the site, near Lawrence Expressway. Surface parking lots are present to the north of the hospital and to the north and east of a large medical office building (refer to Figure 4).

A private recreation facility is present to the west of Calabazas Creek, at the terminus of Hubbard Avenue (refer to Figure 3). This facility includes a pool and tennis courts. A future medical office building, parking structure, and limited surface parking are planned as part of the Medical Center to the west of Calabazas Creek.

As shown in Figure 3, the medical center site is bordered by Homestead Road to the north, Lawrence Expressway to the east, one- and two-story residential and private recreation uses to the south, and industrial uses to the west. One- and two-story residential and commercial uses are present to the north of Homestead Road and east of Lawrence Expressway.

Existing Air Ambulance Operations
at the 900 Kiely Boulevard Site

As previously discussed, Kaiser Permanente currently operates a 286-bed general, acute care hospital at 900 Kiely Boulevard in the City of Santa Clara. Currently, emergency helicopter evacuations of patients from the existing Kaiser Permanente hospital facility on Kiely

Boulevard occur approximately nine to 13 times per year.[12] There is no permitted or designated helipad or heliport at the Kiely Boulevard site.

The Santa Clara Police Department currently assists with each helicopter evacuation from the hospital by closing Kiely Boulevard and Kaiser Drive to vehicular traffic to use Kaiser Drive for helicopter landings and take offs. Helicopters land in the center of Kaiser Drive, near the driveway for the emergency department. Hazards in the vicinity include parking signs along the sidewalk of Kaiser Drive and street trees.[13] Under California State law, helicopter landings for emergency medical purposes at this location are allowed upon authorization of a public safety agency, such as the Police Department.

3. Aviation Hazards Impacts

Thresholds of Significance

For the purposes of this SEIR, an aviation hazards impact is considered significant if the project will:

- result in a safety hazard for people residing or working in the project area; or
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

Approach and Departure Paths

The purpose of establishing and evaluating approach and departure paths is to provide sufficient airspace clear of hazards to allow safe approaches to and departures from landing sites.[14] The proposed location of the helipad and arrival and departure flight paths are shown on Figures 4 and 8. Incoming flights will generally approach from the east and departing flights will generally leave the helipad heading west. While individual flights could deviate from these flight paths due to wind conditions or other factors, they represent the planned flight path and final approach and takeoff flight standards for helicopter flights.

These flight paths have been designed to avoid obstacles, such as tall buildings, trees and utility lines, and to consider predominant wind direction. As previously discussed, constraints on the site include the presence of four-story hospital buildings and parking structures. A utility line is also located to the west of the helipad and Calabazas Creek. The proposed approach and departure paths will be reviewed for their technical conformance with state and federal standards by the California Department of Transportation Division of Aviation as part of the Heliport Permitting process.

As construction will continue on the Kaiser Permanente Medical Center campus for some time after the helipad is planned to be operational, a condition of the Use Permit will be that contractors keep the approach and departure path within the medical center site free of obstructions, such as construction cranes or other tall equipment.

[12] Lee Ann Knight, Senior Project Manager, Kaiser Permanente, personal communications, June 2004 and July 2005, based on information from Kaiser medical and security staff and the Santa Clara Police Department.
[13] Everett Croes, Stanford LifeFlight helicopter pilot, personal communications at site visit, July 21, 2005.
[14] U.S. Department of Transportation, Federation Aviation Administration, Advisory Circular No. 150/5390-2B, September 30, 2004.

Figure 8: Helicopter Approach and Departure Paths

- **In conformance with a State of California Heliport Permit and FAA regulations, proposed flight paths to and from the proposed helipad will provide sufficient clearance over obstacles, such as buildings, that can pose safety hazards to helicopter aircraft. (Less Than Significant Impact)**

Helipad Design and Final Approach and Takeoff Area

The helipad will be elevated 17 feet above grade and designed to meet State and Federal FAA standards for helipad markings and lighting (refer to Figures 5, 6 and 7).

As a private use helipad, an object-free area or Final Approach and Takeoff Area (FATO) will be established. The FATO is a defined area over which the final phase of the approach to a hover, or a landing, is completed and from which the takeoff is initiated.[15] In this case, the FATO will extend slightly beyond the raised helipad landing area. The FATO and an associated safety area surrounding the FATO will be kept free of objects such as buildings and fences which could be struck by the main or tail rotor or helicopter skids. The FATO and safety area will be located entirely within the Kaiser Permanente site (refer to Figure 5).

The helipad will be required to operate under conditions of a Heliport Permit issued by the California Department of Transportation, Division of Aeronautics. Conformance with the permit and FAA regulations will avoid substantial safety hazards for people residing or working in the project area.

- **Construction and operation of a helipad for emergency air ambulance evacuations, in conformance with a State of California Heliport Permit and FAA regulations, will avoid substantial safety hazards for people residing or working in the project area. (Less Than Significant Impact)**

Changes in Air Ambulance Evacuation Location

With the relocation emergency helicopter landings from the 900 Kiely Boulevard site to the new Kaiser facility on Lawrence Expressway, future evacuations of critically ill patients would shift from landing and departures of air ambulances on Kaiser Drive to a permitted helipad adjacent to a new hospital structure. Street closures would no longer be required by the Santa Clara Police Department and a larger, well marked landing area would be available. The proposed project would enhance safety for helicopter pilots, emergency medical staff, patients, and the public.

- **Under the proposed project, landings and takeoffs of emergency air ambulance helicopters would shift from a public street to a helipad designed, constructed and operated in conformance with a State of California Heliport Permit and FAA regulations. This change in the location and type of landing site will avoid and reduce safety risks associated with air ambulance operations. (Less Than Significant Impact/Beneficial Impact)**

[15] U.S. Department of Transportation, Federation Aviation Administration, Advisory Circular No. 150/5390-2B, September 30, 2004.

Accident Rates for Helicopter Trips

The following discussion was prepared based upon a review of helicopter air ambulance accident rates prepared by *Heliplanners* in May 2006. A copy of this memo is included in Appendix D.

There have been reports of an increasing number of helicopter emergency medical service accidents in recent years. Some of these reports perceive a trend. Writing in the Journal of Trauma in 2004 (*A Safety Review and Risk Assessment in Air Medical Transport*), Bryan E. Bledsoe and Michael G. Smith identified a "steady and marked increase in the number of helicopter accidents in the United States during the 10-year period 1993-2002". However, of the 84 medical helicopter accidents they identified, they state that 52 percent of these occurred during the last three years of the period. In August 2005, Helicopter Association International (HAI) released a report titled *Improving Safety in Helicopter Emergency Medical Operations*. HAI counted 127 helicopter accidents associated with emergency medical operations since 1991. They estimate that the number of helicopters dedicated to air medical service has increased from about 225 helicopters flying 162,000 hours in 1991, to over 650 helicopters logging in excess of 300,000 hours in 2005. As in the Bledsoe and Smith study, HAI does not attempt to assess quantifiable risks, such as the number of accidents per flight hour. The HAI report is primarily concerned with the proportion of accidents that may have been prevented through new regulations and/or operator practices. The data was not compared to the 36 percent decrease in estimated flight hours per emergency medical service (EMS) helicopter between 1991 and 2005. Similarly, the Bledsoe study states that the observed increase in the accident rate (per year) may simply be a result of a marked increase in the number of helicopter operations in the United States and not a decline in operational safety.

In August 2005 the National Transportation Safety Board (NTSB) staff began a special investigation of EMS operations and reported to the Board on January 25, 2006. Although the NTSB investigation looked at accidents involving both airplanes and helicopters, its report cited the HAI statistics discussed above. The staff identified 55 EMS accidents (both airplanes and helicopters) during the three-year period ending in January 2005 to study specific causes upon which to base recommendations to the NTSB. These recommendations principally involved petitioning the FAA to improve rules and guidelines for EMS operators that would help decrease the incidence of EMS accidents that are deemed preventable.

The NTSB also determined that the current data needed to identify trends and to evaluate the probability of an accident for a particular EMS operation, such as a hospital helipad, was unreliable or unavailable. Accordingly, the NTSB has requested the FAA Helicopter Air Ambulance EMS Accident Task Force to conduct a survey of operators to help provide information for the determination of accident rates by the NTSB. This study is expected to be completed approximately by the end of 2006.

An evaluation of available accident information is provided below.

National and Statewide Accidents

In 2004, the national accident rate for all civilian helicopter flights was 2.70 accidents per 100,000 departures. Figure 9 depicts the general trend in helicopter accident rate per 100,000 departures on a nationwide basis as reported by the Helicopter Association International

(HAI). This data applies to accidents anytime during a helicopter flight, not just at approaches or departures. The database covers 35 years.

Overall, the accident rate has generally decreased from a high of about ten accidents per 100,000 departures in 1970 to below four (below three in several years) during the past fifteen years.

Applying the 2004 accident rate to the anticipated number of flights per year (approximately 15 flights per year in the future) results in an estimate of approximately 0.000405 accidents per year, or about one accident every 2,469 years for the project flight operations. This would apply to all locations along the helicopter's route of travel and not just in the vicinity of the new hospital facility and proposed helipad.

Heliplanners noted that is important to understand that Figure 9 and the 2004 accident rate represent nationwide figures and cover all types of civil (non-military) helicopter operations. Several factors suggest that the accident probability associated with the proposed hospital helipad would be better (lower) than the national average. For example, weather should be less of a factor in Santa Clara than in some parts of the country that are subject to much more rain, snow, ice, and unfavorable winds. In addition, landings and takeoffs at Kaiser Santa Clara would not include types of operations that might be considered more dangerous but that are included in the national database. These include operations such as instructional, aerial application (crop dusting), external load, and aerial observation (such as power line patrol). Each of these helicopter operation types may involve more hazardous characteristics than those for hospital helipad.

A classification of accidents resulting from different types of civil helicopter flights during the ten-year period from 1995 through 2004 is shown in Table 1.

Air medical helicopter operators generally maintain high flight crew hiring standards and their crews generally have many years of helicopter experience. As shown in Table 1 air medical operations accounted for only about 4.4 percent of all civil helicopter accidents during this period. Air medical accidents rank well below some of the other classifications that tend to increase the overall accident rate.

NTSB records for the six-year period ending January 1, 2006 show a total of 156 helicopter accidents (not counting less serious "incidents") within California. They do not show an increasing trend.

As shown in Table 2, five (3.2 percent) of these California helicopter accidents can be considered to be related to emergency medical operations; either by operating to or from an emergency landing site, or by repositioning between a hospital helipad and the aircraft's home base. Three accidents occurred in remote areas while in route. One each occurred while attempting landing and takeoff operations at emergency sites with impaired visibility and nearby obstructions. None of these accidents involved a permanent, state approved hospital helipad.

Figure 9: Civilian Helicopter Accident Rates

Table 1 Classification of Helicopter Accidents Nationwide (1995-2004)	
Type of Operation	**Percentage of Total Accidents**
Personal	21.2
Instructional	16.7
Undefined	10.4
Public Use	10.1
Aerial Application	9.7
External Load	6.5
Air Taxi (Charter)	5.9
Business	5.2
Air Medical	**4.4**
Aerial Observation	4.1
Sightseeing	1.8
Commercial Air Tour	1.7
Utilities	1.4
Electronic News Gathering	0.6
Executive/Corporate	0.3
Total	100
Source: Helicopter Association International [http://www.rotor.com/Safety/03summarystats.pdf]	

Table 2 Number of Helicopter Accidents in California by Calendar Year							
Type of Operation	2000	2001	2002	2003	2004	2005	Total
All	37	29	20	25	24	21	156
EMS	-0-	2	2	1	-0-	-0-	5
EMS Accidents (Percent)	0 %	6.9%	10.0%	4.0%	0%	0%	3.2%

Evaluation of Proposed Heliport Landing Area

The proposed helipad would be a fully permitted heliport that meets recognized obstruction-clearance and other safety-related standards of the FAA. This provides an inherently safer operational environment at the hospital end of a helicopter trip than crews might encounter in other phases of a flight. Based on all of these factors, it is the professional opinion of *Heliplanners, Inc.* that the potential accident rate in the vicinity of the proposed helipad should be lower than the overall national rate. For the above described reasons, the proposed helipad would result in a less than significant safety hazard related to helicopter landings and take offs.

- **Air ambulance flights to and from a proposed new helipad at the Kaiser Permanente Santa Clara Medical Center would not result in substantial safety risks to residents under flight paths or in the vicinity of the helipad based upon a review of national accident rates and proposed operations. (Less Than Significant Impact)**

4. Conclusion

Construction and operation of the proposed helipad in accordance with FAA and Heliport Permit regulations would not create or result in substantial new safety hazards due to helicopter flights. **(Less Than Significant Impact)**

C. NOISE

The following discussion is based on an Environmental Noise Assessment prepared by *Illingworth & Rodkin, Inc.* in September 2005. A copy of this analysis is included in Appendix E.

1. Existing Setting

Overview

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is amplitude of sound waves combined with the reception characteristics of the ear. Amplitude may be compared with the height of an ocean wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. Noise is measured in "decibels" (dB), which is a numerical expression of sound levels on a logarithmic scale. A noise level that is 10 dB higher than another noise level has 10 times as much sound energy and is perceived as being twice as loud. Sounds less than five dB are just barely audible, and then only in the absence of other sounds. Intense sounds of 140 dB are so loud that they are painful and can cause damage with only a brief exposure. These extremes are not commonplace in our normal working and living environments.

Noise impact analyses commonly use A-weighted or dBA measurements which give greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA at various distances from common noise sources are shown in Table 3.

Since excessive noise levels can adversely affect human activities, such as conversation, sleeping, and human health, various federal, state and local agencies have set forth criteria or planning goals to minimize or avoid these effects. Noise guidelines are usually expressed using one of several noise averaging methods, such as the Noise Equivalent Level (L_{eq}), the Community Noise Equivalent Level (CNEL), and the Day/Night Average Sound Level (L_{dn} or DNL). The Noise Equivalent Level is a measurement of the average energy intensity of noise over a given period of time, such as the noisiest hour. Since the sensitivity to noise increases during the evening and at night (excessive noise interferes with the ability to sleep), 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. For this report, the Day/Night Average Sound Level (L_{dn}), which has a 10 dB penalty added to noise levels during nighttime hours (10:00 PM - 7:00 AM), will be used to assess consistency with the General Plan guidelines of the City of Santa Clara. Maximum noise levels over short periods, expressed as Sound Exposure Levels (SEL),[16] will also be used to describe short-term noise-generating events.

[16] The SEL is equal to the maximum sound level produced by the noise event plus ten times the logarithm of the effective time of the event (*i.e.*, and aircraft flyover). SEL gives weight to the length of time a person hears the noise.

Table 3 Typical Sound Levels Measured in the Environment		
Common Outdoor Noise Source	**Noise Level (dBA)**	**Common Indoor Noise Source**
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
Most quiet remote areas	10 dBA	Quiet recording studio
Threshold of human hearing	0 dBA	Threshold of human hearing

Regulatory Overview and Background

The State of California and the City of Santa Clara have established guidelines, goals, policies, and standards that are designed to limit noise exposure at noise-sensitive land uses. These include: 1) the State California Environmental Quality Act (CEQA) guidelines; 2) the State Building Code; and 3) the City of Santa Clara General Plan Noise Element and Municipal Code. The State Aeronautics Act and California Airport Noise Regulations also address noise exposure from special-use helipads at hospitals.

State CEQA Guidelines

CEQA has established guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. In Appendix G, the environmental checklist, a project would normally be considered to have a significant impact if the resulting noise levels conflict with standards in the local General Plan or Noise Ordinance or applicable standards of other agencies, if noise levels generated by the project would substantially increase existing noise levels, if persons would be exposed to excessive ground-borne noise or vibration, if persons would be located within two miles of a public airport and exposed to excessive noise levels, or if persons would be exposed to a substantial temporary or periodic increase in ambient noise levels in the project vicinity.

CEQA does not define what noise level increase would be considered substantial. Typically, in high noise environments, if the L_{dn} due to the project would increase by more than three (3) dBA at noise-sensitive receptors, the impact would be considered significant. Where the existing noise level is lower, a somewhat higher increase can be tolerated before a significant impact occurs.

California State Building Code

The interior noise environment inside hospital patient rooms is subject to the environmental noise standards set forth in the California State Building Code (California Code of Regulations Part 2, Title 24, Section 3501). The purpose of the regulations is to establish uniform, minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings, other than detached single-family dwellings from the effects of excessive noise, including but not limited to, hearing loss or impairment and interference with speech and sleep.

Residential structures located in noise-critical areas, such as proximity to highways, county roads, or city streets shall be designed to prevent the intrusion of exterior noises beyond prescribed levels. The allowable interior noise level attributable to exterior sources shall not exceed 45 dBA in any habitable room. The noise measurement shall be either the day/night average noise level (L_{dn}) or the community noise equivalent level (CNEL) consistent with the Noise Element of the local General Plan. Future noise levels shall be predicted for a period of at least 10 years from the time of building permit application.

City of Santa Clara

The City of Santa Clara addresses environmental noise issues in the noise section of the General Plan Environmental Quality Element. The City of Santa Clara also regulates noise and vibration through the Santa Clara City Code (Chapter 9.10 Regulation of Noise and Vibration).

The City uses a noise and land use compatibility chart that establishes areas exposed to an L_{dn} or CNEL of below 55 dBA to be compatible with residential land uses. Exposure of residences to noise levels between 55 and 70 dBA CNEL or L_{dn} is judged to require design and sound insulation to reduce noise levels. Noise environments exceeding 70 dBA CNEL or L_{dn}, are considered incompatible with residential use.

General Plan Noise Policies

The noise policies in the adopted General Plan that are relevant to this project are listed below:

Policy 20: Protect to the extent possible existing developed areas of the City of Santa Clara from unacceptable noise levels.

Policy 22: Comply with City, State and Federal guidelines for the compatibility of land uses with their noise environments, except where the City determines that there are prevailing circumstances of a unique or special nature.

Policy 24: Reduce noise from fixed sources, construction and special events.

General Plan Noise Programs

Programs included in the General Plan that address noise and are relevant to this project include:

Program (xxvii): Regulate existing noise sources through the City's Noise Ordinance and other applicable codes.

Program (xxviii): Evaluate the impacts of new noise sources on the community and identify appropriate mitigation.

Program (xxix): Adopt, periodically evaluate, and update community noise impact and attenuation standards.

Santa Clara City Code - Regulation of Noise

The Santa Clara City Code regulates noise and vibration from fixed sources. Exterior noise limits (maximum noise levels) at receiving residential properties are 50 dBA during the nighttime (10:00 PM to 7:00 AM) and 55 dBA during the daytime. The limits at receiving commercial or office properties are 60 dBA during the nighttime and 65 dBA during the daytime. These limits apply to real property and are adjusted upwards in 5 dB increments as appropriate to encompass or reflect louder ambient noise environments.

California Airport Noise Regulations

Noise regulations in Title 21 of the California Code of Regulations (Section 5006) establishes the level of noise acceptable to a 'reasonable' person as a Community Noise Equivalent

(CNEL)[17] of 65 dB or below and identifies the following types of land uses as incompatible with a noise level of 65 dB CNEL or greater:

- Residences of all types
- Public or private schools
- Hospitals and convalescent homes

State Aeronautics Act

The State Aeronautics Act (Public Utilities Code Sections 21001 et seq.) covers a range of aeronautical issues governed by the State of California. It references the California Airport Noise Regulations described above and the California Department of Transportation Airport Land Use Planning Handbook regarding noise issues. The Act specifically exempts individual emergency aircraft flights from restrictions on time of departure and arrival as described below.

Section 21662.4(a) of the State Aeronautics Act titled "Emergency Flights for Medical Purposes" states that:

"Emergency aircraft flights for medical purposes by law enforcement, fire fighting, military, or other persons who provide emergency flights for medical purposes are exempt from local ordinances adopted by a city, county, or city and county, whether general law or chartered, that restrict flight departures and arrivals to particular hours of the day or night, that restrict the departure or arrival of aircraft based upon the aircraft's noise level, or that restrict the operation of certain types of aircraft."

Effects of Noise

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher.

Steady noise of sufficient intensity above 35 dBA, and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA Ldn. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is, therefore, possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way.

[17] CNEL, or the Community Noise Equivalent, is a measure of the cumulative noise exposure in a community, with a five (5) dB penalty added to evening (7:00 PM - 10:00 PM) and a 10 dB addition to nocturnal (10:00 PM - 7:00 AM) noise levels. It is similar to the Day/Night Average Sound Level, Ldn , except that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Maximum Noise Levels and Sleep Disturbance

As discussed previously under *Regulatory Setting*, the State of California and the City of Santa Clara typically use a noise descriptor based on average day/night levels (L_{dn} or CNEL) when determining the compatibility of noise with various land uses. In situations where the noise environment is composed of relatively infrequent, high noise-level events, such as in the vicinity of an emergency helipad, the L_{dn} /CNEL descriptors have a tendency to average out some of the important potential effects of noise.

The Federal Interagency Committee on Aviation Noise (FICAN) has evaluated the relationship between indoor Sound Exposure Levels (SEL) and the expected percent of sleep disturbance in residential settings (residential awakening).[18] An indoor SEL of 80 dB or less was found to result in 10 percent or less of a given population being awakened. Assuming a minimum exterior to interior noise attenuation of 12 to 17 dBA by structures with open windows, an exterior SEL of 92 dB would produce an interior SEL of approximately 78 dB with open windows and could result in sleep disturbance for approximately 10 percent of people exposed to noise from overflights.

Existing and Projected Future Noise Environment

The 1995 Final EIR for the Kaiser Permanente Santa Clara Medical Center Replacement Project identified traffic on local roadways, including Lawrence Expressway and Homestead Road, as the principal sources of noise affecting the project area. Noise measurements at the southern property line of medical center were taken by Thorburn Associates in July 2001.[19] At that time, the existing ambient noise levels ranged from 52 to 64 dBA L_{dn}. Estimated noise levels generated by the new medical center (without the proposed helipad) will be between 49 to 54 dBA L_{dn} at the southern property line. The resulting cumulative levels from currently approved hospital and medical center activities and existing background noise levels will be between 56 and 64 dBA L_{dn}.

2. Noise Impacts

Thresholds of Significance

For the purposes of this SEIR, a noise impact is considered significant if the project will result in:

- exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or
- a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

[18] FICAN. 1997. *Effects of Aviation Noise on Awakenings from Sleep.* Refer to discussion and dose-response curve showing percent awakening and indoor sound exposure level (SEL) in Appendix A of this EIR.

[19] Noise measurements taken in 2001, before medical center construction started, reflect the ambient noise environment without construction activity. A copy of this study is included in Appendix A of this SEIR.

A significant noise impact would result if noise levels increase substantially at noise-sensitive land uses, such as residences.

A substantial permanent increase in noise levels would occur if the project resulted in an increase of three (3) dBA L_{dn} or greater at noise-sensitive land uses where noise levels already exceed 60 dBA L_{dn}.

A significant local impact can also be identified for existing uses near the project if they would be exposed to a substantial temporary or periodic increase in ambient noise levels. Within the urban area of the City of Santa Clara, a substantial periodic increase in ambient noise levels would occur if residents are exposed to more than 10 nighttime helicopter overflights per year that could result in sleep disturbance. Short-term exterior noise levels of 92 dB SEL (Sound Equivalent Level)[20] or greater correspond to sleep disturbance of greater than 10 percent of exposed people based upon a study completed by the Federal Interagency Committee on Aviation Noise (FICAN).[21]

Project Overview

The project includes construction and operation of a helipad for emergency air ambulance flights. The helipad at the Kaiser Permanente Santa Clara Medical Center site is proposed to be located on a 17-foot high platform on the south side of the main hospital complex (refer to Figure 5). The center of the proposed helipad is located 1,070 feet from the north property line, 760 feet from the west property line, 310 feet from the south property line, and 1,270 feet from the east property line of the medical center site. The helipad would be approximately 65 feet from the southern façade of the new hospital.

The primary flight paths into and out of the helipad are projected to follow an east to west ground track. Incoming flights will generally approach from the east and departing flights will generally leave the helipad heading west.

In the near term, approximately three to four emergency helicopter evacuations per year are anticipated for medical evacuations of premature infants to the Stanford University Medical Center. Kaiser Permanente Medical Staff estimates that it is possible that an additional ten to eleven medical flights of critically ill patients per year could occur in the coming years due to the development of specialized treatments that are available at surrounding medical facilities. This Initial Study, therefore, analyzes the impacts from the proposed helipad based on an average of fifteen helicopter flights per year (over any two year period).

Helicopter noise has a distinctive character. Although a portion of the noise comes from the engines, the distinctiveness of helicopter noise is largely due to the modulation of the sound created by the relatively slow turning main rotor. This sound modulation is referred to as blade slap. Blade slap is most pronounced during low speed descents and high-speed cruise. To persons on the ground, helicopters are most audible as the aircraft approaches a landing area. Figure 10 shows 65 dBA and 75 dBA maximum instantaneous noise level ground contours for a typical small helicopter on takeoff and landing. The helipad may be used by several Emergency Medical Services (EMS) companies. The helicopter models which will normally utilize the helipad include the Bell Model B222, Augusta Model A109, MBB B105,

[20] Maximum noise levels over short periods, expressed as Sound Exposure Levels (SEL), are used in the following discussion to describe short-term noise-generating events.
[21] FICAN. 1997. *Effects of Aviation Noise on Awakenings from Sleep.*

Figure 10: Noise Footprint of Helicopters

and Eurocopter models BK-117, AS355, and AS365. These models are representative of the type and size of the EMS helicopters that would travel to the site. The proposed approach and departure flight paths to and from the helipad are shown on Figure 8 and the anticipated flight profiles for helicopter approach and departure are shown on Figure 11.

To understand the expected noise levels produced by helicopters approaching and departing from the proposed helipad, these two events can be divided into distinct activities.

Helicopter Approaches

A helicopter approach to the pad begins with the craft traveling at a speed of 125 knots[22] at a cruise elevation of 1,000 feet, producing maximum noise levels of between 70 to 71 dBA on the ground directly beneath its flight path. Between one mile and one-half mile from the helipad the craft decelerates from 125 knots to 70 knots, producing ground level maximum noise of between 73 and 74 dBA. At about one-half mile from the helipad, the craft begins to descend to a height of 100 feet at a distance of 200 feet from the helipad. At this point the helicopter decelerates to 70 knots. This activity will take less than 30 seconds and can produce maximum noise levels of 75 to 83 dBA between the southern property line[23] and on the ground plane directly beneath the flight path. During the final 200 foot approach to the helipad the helicopter descends an additional 20 feet to a height of 80 feet above the helipad and decelerates to a ground speed of zero. This activity will take less than five seconds and is expected to produce a maximum noise level of 84 dBA at the closest residential property line. Once a ground speed of zero is reached the helicopter begins a vertical descent to the landing pad. This phase typically takes about 10 seconds and is expected to produce a maximum noise level of 84 dBA at the closest residential property line. Once on the helipad surface the craft undergoes a two-minute ground idle. As with the departure idle, this activity is expected to produce a maximum noise level of between 69 and 74 dBA at the closest residential property line. Following the idle period, the craft is either shut down to await another cargo or initiates its departure procedures. Overall the main noise producing portion of the helicopter approach will take under three minutes, with surrounding land uses exposed to maximum sound levels over 80 dBA during less than two minutes of this time.

Departures

For a helicopter departure, startup and flight checks are performed in a ground idle phase. This typically lasts for three minutes. Given the relationship between the proposed helipad and the closest residential land uses (approximately 310 feet south of the center of the helipad and approach and departure flight paths), this activity is expected to produce a maximum noise level of 69 to 74 dBA at the closest residential property line. Following the flight checks and start-up, the rotor blades begin turning at full power, a hover is initiated and the craft ascends vertically to 100 feet above the pad. This phase typically takes about 10 seconds and is expected to produce a maximum noise level of 84

[22] "Knot", or nautical miles per hour, is term used in aviation to characterize speed. One knot is equivalent to 1.15 mile per hour.

[23] The southern property line is approximately 310 feet from the center of the helipad and the approach and departure paths.

Figure 11: Typical Approach and Departure Profiles

dBA at the closest residential property line. Once an altitude of 100 feet is achieved, the helicopter accelerates horizontally for 200 feet and reaches an air speed of 70 knots. This activity will take less than five seconds and is expected to produce a maximum noise level of 80 dBA at the closest residential property line. After accelerating to 70 knots the craft begins to ascend to an altitude of 1000 feet, which it achieves after covering just under one-half mile horizontally. This activity will take less than 30 seconds and can produce maximum noise levels of 72 to 80 dBA along an extension of the southern property line and on the ground plane directly beneath the flight path. At an elevation of 1,000 feet the helicopter accelerates to its cruising speed of 125 knots in level flight, producing maximum noise levels of between 70 to 71 dBA on the ground directly beneath its flight path. Overall the main noise producing portion of the departure to altitude and cruising speed from initial start up will take under four minutes, with surrounding land uses exposed to maximum sound levels over 80 dBA for less than one minute of this time.

Average Noise Exposure

The Federal Aviation Administration's (FAA) Helicopter Noise Model (HNM) version 2.2 was used by Thorburn Associates to determine the expected average noise levels produced by helicopter operations on the site and in the project vicinity.[24] The HNM 2.2 model contains complete noise data for the Bell 222 and the Augusta 109, which represent one of the highest capacity EMS helicopters and a middle capacity, respectively. The Augusta 109 noise levels are slightly greater than those produced by the Bell 222. To conduct a conservative or "worst case" analysis of helipad operations, Thorburn Associates conducted the model for a day in which one (1) Augusta 109 helicopter approached and departed the helipad.[25] Since the Augusta 109 is the noisiest of the helicopters that would use the helipad and the trend among helicopter manufacturers is toward quieter models as technology improves, this noise analysis reflects the worst-case scenario.

No off-site residential structures would be located within the 65 dBA CNEL noise impact boundary of the proposed helipad. The 55 and 65 dBA L_{dn} contours from the helicopter noise modeling results are shown in Figure 12.

On an average day/night level basis, the hospital's southern façade will be exposed to an L_{dn} of 50 to 63 dBA. Sound attenuation provided by the walls and windows of the hospital building would be anticipated to reduce interior noise levels by at least 20 dBA. Average interior noise levels would not exceed the land use compatibility guidelines for sensitive uses in the Santa Clara General Plan.

Based upon noise modeling conducted for the proposed project, operation of the proposed emergency helipad facility will not expose on-site or off-site sensitive receptors to time-averaged noise levels of 65 dBA L_{dn} or greater.

[24] Note that the center of the helipad is approximately 310 feet from the southern property line. As appropriate, the helicopter modeling used this distance rather than the distance to the southern edge of the helipad (285 feet).
[25] FAA approved aircraft noise models are typically run for the annual average daily usage. In this case, a conservative "average" usage of two helicopters per 30 days, or an average of .066 flights per day, was used.

Figure 12: Projected Average Noise Levels

- **The proposed project would not expose people to noise levels in excess of time averaged noise standards in the City of Santa Clara General Plan or noise regulations in the California Code of Regulations, California Airport Noise Regulations. (Less Than Significant Impact)**

Maximum Noise Levels and Sleep Disturbance

As previously discussed on page 38 of this SEIR, the 92 dB exterior SEL contour can be used as a conservative predictor of areas potentially exposed to an increased level of sleep disturbance from helicopter overflights. This assumes a worst-case condition with residential windows open.

Maximum Noise Level Impacts to Nearby Residential Uses

To determine the worst-case noise exposure at residential uses under the proposed approach and departure paths, the SEL during a single combined takeoff and landing of a Augusta Model A109 helicopter was derived from the HNM model results.[26] The 92 dBA SEL contour in the project vicinity is shown in Figure 13. Specific SEL levels were also determined at 13 locations along the southern property line (refer to Figure 14). Based on the results shown on Figure 14, the residential lot lines directly to the south of the hospital will be exposed to SELs of 92 to 99 dBA during a typical helicopter approach/departure event.

Based upon the 92 dBA SEL contour shown in Figure 13, maximum noise levels produced by helicopters approaching the proposed helipad on the proposed flight path could result in temporary, periodic daytime disturbances and nighttime sleep disturbances within the residences in the vicinity of the approach path. Sutter Elementary School is also located just south of the flight path on the south side of Forbes Avenue at Pomeroy Avenue.

Within the urban area of the City of Santa Clara, a substantial periodic increase in ambient noise levels associated with helicopter overflights would occur if the project resulted in short-term exterior noise levels of 92 dB SEL or greater and if residents are exposed to these short-term noise levels more than 10 times per year during nighttime hours. Under the proposed project, there would be approximately 3-4 helicopter flights per year to the helipad in the near term and an average of approximately 15 helicopter flights to the helipad per year in the future. Assuming that helicopter evacuations would occur at random times during the day, sleep disturbance of residents under the planned flight path during nighttime hours (10 p.m. to 7 a.m.) would occur approximately once or twice per year in the near term and six times per year in the future. Using a conservative estimate, or worst-case conditions, where all flights occurred during nighttime hours, sleep disturbance could occur approximately four times per year in the near term and 15 times per year in the future. Assuming a worst-case condition,[27] helipad operations under the proposed project would result in a significant periodic noise impact to residents south and east of the proposed helipad in Santa Clara (refer to Figure 13).

[26] The relationship between the SEL and the L_{dn} a single daytime arrival and departure can be expressed as follows: L_{dn} = SEL +10log(N) – 10log (T), were N equals the number of events and T equals the number of seconds per day. Based on N = 1 and T = 86400 sec. The 92 dBA SEL contour equals the 42.6 dBA L_{dn} contour.

[27] The worst-case condition consists of overflights of the Augusta 109 model helicopter, with residential windows open, and all or most future flights during nighttime hours.

Figure 13: Helicopter Primary Approach and Departure Path (92 SEL Contour)

Figure 14: Estimated Maximum Noise Levels at Selected Locations

- **Some residential areas near the planned flight path between Saratoga Creek and Lawrence Expressway and south of the proposed helipad would be exposed to temporary increases in noise levels to 92 dBA SEL or more during emergency helicopter landings and departures. In the near term, one to four nighttime helicopter overflights per year would not result in a substantial increase in periodic noise. Using a conservative estimate (worst-case conditions) where all flights occurred during nighttime hours, sleep disturbance could occur approximately 15 times per year in the future. This would result in a significant periodic noise impact to residents. (Significant Impact)**

Maximum Noise Level Impacts to the New Hospital Project

Specific SEL levels were determined at 10 locations along the southern façade of the new hospital building (refer to Figure 14). The hospital's southern façade will be exposed to SELs of 103 to 112 dBA during a typical helicopter approach/departure. Patient rooms, a corridor, and the emergency department are located on the south side of the hospital.[28] The hospital structure will have closed windows and provide noise attenuation of approximately 35-36 dBA SEL. Noise levels in patient rooms along the southern façade from helicopter arrivals and departures would range from approximately 65-75 dBA SEL, with the higher noise levels closer to the helipad (refer to Table 3 or a list of short-term events with similar noise levels).

Maximum noise levels produced by a helicopter at the helipad may result in daytime and nighttime sleep disturbances within patient rooms of the hospital facility that face the helipad. Flights to and from the helipad would be relatively infrequent (an average of 15 flights per year) and patients would not be expected to be in the hospital facilities near the helipad for extended periods of time.

- **Patient rooms on the south side of the hospital closest to the hospital would be exposed to a periodic increase in noise levels associated with emergency helicopter landings and departures. This temporary and short-term noise exposure would be infrequent and individual patients would be unlikely to be exposed to multiple events. The proposed location of the helipad, therefore, would not result in a significant temporary or periodic increase in ambient noise levels in hospital patient rooms. (Less Than Significant Impact)**

4. <u>Comparison of Noise Impacts to Conditions at Existing Kaiser Hospital</u>

Helicopter Noise at Existing Kaiser Hospital
900 Kiely Boulevard

The use of emergency helicopter evacuations and noise associated with them is not a new proposed use in the general area because the existing Kaiser Hospital on Kiely Boulevard currently uses helicopters for emergency evacuations. The affected residential population would, however, be shifted from the vicinity of Kiely Boulevard at Kaiser Drive to the vicinity of the new hospital site.

The existing Kaiser Hospital facility located at 900 Kiely Boulevard does not have a dedicated helipad. Helicopters used for emergency evacuations land on Kaiser Drive

[28] Zigmund Rubel, Anshen+Allen, Architects, personal communications, July 1, 2004.

adjacent to the driveway for the hospital emergency department. To accomplish this, local public safety officers close down roadways on either side of the landing site to keep vehicle traffic from interfering with helicopter operations. Depending on wind conditions, helicopters approaching or departing the landing area use the flight paths shown in Figure 15.

To determine the existing worst-case noise exposure for normal and abnormal wind conditions at this location, the SEL during a single combined takeoff and landing of an August A109 helicopter was determined based upon the FAA's Helicopter Noise Model (refer to Appendix E). The 92 dBA SEL contours for normal and abnormal wind conditions are shown in Figure 16.

The relative appearance of the future and existing SEL curves for the future (refer to Figure 13) versus existing conditions (Kaiser Kiely Boulevard Facility; refer to Figure 16) are different. This difference occurs due to two factors; the first being that helicopter approaches to the existing landing site require a steeper approach and departure slope due to ground level obstructions such as large trees and buildings which must be avoided that do not occur at the new facility, and the second being the non-linear (i.e. curved) approach paths at the Kiely Boulevard site which effectively concentrates the area exposed to high noise levels whereas the linear (i.e. straight) approach path at the proposed Homestead Road facility effectively spreads out the area exposed to short-term high noise levels.

A visual analysis of aerial photographs shows a large multiple family (condominium) development and the existing hospital and medical office buildings within the existing 92 dBA SEL contour under normal wind conditions. When the alternative approach and departure are used at the Kiely Boulevard site, additional single family and multiple family residences to the west and south are within the 92 dBA SEL. For the proposed helipad site, the 92 dBA SEL extends over single family and multiple family residences and commercial uses to the east of Lawrence Expressway and single family and multiple family residences to the south of the new Kaiser Medical Center site. The proposed project would represent a shift in location of short-term noise exposures to residential uses in the City of Santa Clara associated with emergency helicopter overflights.

5. Mitigation and Avoidance Measures

The conditions in the Use Permit for the proposed helipad would limit the types of landings at the site to those of evacuation of critically ill patients where time is of the essence. This would restrict the number of flights and associated temporary increases in noise levels in the vicinity of the proposed helipad. The project also includes the following measures to avoid or limit annoyance from occasional helicopter overflights to the extent feasible:

- A program of monitoring helicopter operations will be established by Kaiser Permanente. The applicant shall submit to the Director of Planning on July 1st of each year a copy of the helipad log, which includes dates and times of all arrivals and departures, helicopter type and flight path used, and reason for each helicopter flight.

  Primary approach and departure flight paths will be posted at the facility and provided to all helicopter pilots. Deviations from the approved flight path/safety areas may be flown only due to wind conditions judged by pilots to be an overriding safety concern or safety direction from the FAA or air traffic controllers.

Figure 15: Helicopter Approach and Departure Paths—Kiely Blvd. Site

Figure 16: 92 SEL Contour – Kiely Blvd. Site

- A Helipad Noise Disturbance Coordinator responsible for responding to any local complaints about emergency helicopter overflight noise will be designated by Kaiser Permanente. The disturbance coordinator would determine the cause of the noise complaint (e.g., date and time of reported operations and routes and elevations flown). The telephone number for the disturbance coordinator will be available at the hospital and included in notices sent to neighbors regarding the proposed project.

  Annual reports of noise complaints will be forwarded to the City of Santa Clara Director of Planning along with helipad logs.

- The Helipad Noise Disturbance Coordinator, or other Kaiser Permanente staff, will (to the extent feasible) notify emergency communications dispatchers in the City of Santa Clara of incoming emergency helicopter flights. The purpose of timely notification is to facilitate responses to inquiries by citizens and other agencies as to the nature and purpose of helicopter overflights in the area.

Helicopter Flight Path Approach Elevations
(Measure Not Included in the Project)

The following discussion is provided in order to provide information to decision makers and the public on practices that could reduce exposure of residential uses to short-term elevated noise levels from air ambulance helicopter overflights shown on Figure 13.

As discussed in Appendix E, if approaching helicopters maintain a higher elevation (than the approach modeled in the noise analysis and shown in Figure 13) until passing over Lawrence Expressway and use a steep approach angle between Lawrence Expressway and the helipad, the SEL of approaching helicopters at the residential land uses east of the Lawrence Expressway could be reduced. To an extent, this may occur in practice, as can be seen in the 92 dBA SEL for the existing Kaiser facility shown in Figure 16.

It should be noted that the City of Santa Clara per the State Aeronautics Act cannot require emergency helicopter flights to follow proscribed flight paths or limit the allowed hours of emergency flights.

For those flights where the approach angle is steeper than the approach modeled in this SEIR, the area exposed to short-term elevated noise levels of 92 dBA or above would be reduced.

6. Conclusion

Construction and operation of a proposed helipad on the Kaiser Permanente Santa Clara Medical Center for emergency medical evacuations would result in occasional temporary increases in ambient noise levels. Since the timing and frequency of helicopter operations is a function of when non-scheduled (emergency) evacuations are required, and using conservative estimates (the worst-case scenario) more than 10 nighttime flights per year could occur, the project would result in significant and unavoidable periodic noise annoyance from new emergency helicopter operations. **(Significant Unavoidable Impact)**

D. VISUAL RESOURCES

1. Existing Setting

Visual and Aesthetic Context

The project site is located within an urban area. The existing visual aesthetic character of the project site is that of a developed medical center campus (under construction) with large multiple-story buildings and parking structures. A mixture of residential, commercial and office buildings and associated landscaping are present in the surrounding area. The mass and scale of these one- and two-story buildings is less than the buildings on the medical center site.

The Kaiser Permanente Medical Center campus is primarily visible from the two adjacent roadways: Lawrence Expressway and Homestead Road.

Calabazas Creek crosses the medical center campus to the west of the proposed helipad. Stepped, rock-filled wire baskets (gabions) have been installed along the creek channel with plantings of native trees and shrubs on the upper banks of the creek. The creek corridor is primarily visible from the site and at the creek crossings of Homestead Road and Pruneridge Avenue.

Scenic Views

The project site is located in a densely developed area of the Santa Clara Valley, a broad alluvium plain bordered by mountains of the Santa Cruz and Diablo Ranges. There are no prominent viewpoints (other than buildings) within or adjacent to the project site and this area of the Santa Clara Valley is flat. The most visually prominent scenic resources in this region are the hillsides that border the Santa Clara Valley to the east, west, and south. Foothill areas to the east are visible from Homestead Road. These foothills are not generally visible in the project vicinity due to buildings and trees blocking views.

There are no designated scenic highways in the project vicinity.

2. Impacts

For the purposes of this SEIR, a significant impact to visual resources will occur if the project would:

- have a substantial adverse effect on a scenic vista; or
- create a new source of substantial light or glare which would adversely affect day or nighttime views in the area; or
- substantially degrade the existing visual character or quality of the site and its surroundings.

Visual and Aesthetic Impacts

Project Visibility

Within the Kaiser Permanente campus, the proposed helipad site is on the south side of a four-story building which is under construction. An open parking area and concrete block wall are located between the helipad site and single-family residences to the south. Views of the proposed helipad from Homestead Road and Lawrence Expressway will be blocked by buildings and other structures.

The edge of the helipad platform is located approximately 285 feet to the north of the concrete block wall (south property line) and the center of the helipad is approximately 310 feet from the wall. A portion of the buildings under construction near the proposed helipad site are visible above masonry sound walls at the end of Giannini Drive and Carlysle Drive, to the south of the site and from the terminus of Hubbard Avenue (refer to Photos 1 and 2).

The 17-foot high helipad platform would be located adjacent to the main hospital building, as shown in Figures 5 - 7. The platform would be lower than surrounding four-story structures and would not be visually prominent or block views of scenic resources or natural features.

Helicopter approaches and departures would be visible from some residential streets south of the medical center site; however, the masonry wall and planned landscape buffer along the southern property line at the end of Giannini Drive would block views of the helipad platform (refer to Photo 1).

The distance between the helipad's center and adjacent objects (trees, buildings, power lines, etc.) to the sides of the flight path exceeds the required obstruction-clearance criteria of the California Department of Transportation Division of Aeronautics and, therefore, no pruning or removal of existing trees would be required.

Obstructions beyond 250 feet to the side of the helipad's center do not require obstruction clearance under FAA safety requirements. Existing and planned landscape screening trees will be more than 250 feet from the helipad center and construction and operation of the proposed helipad would not affect the planting and maintenance of landscape screening trees along the south property line.

The proposed helipad, located near the center of the medical center campus, would be visible from some adjacent land uses, but would not be clearly visible from vehicles on Homestead Road or Lawrence Expressway.

The project would not result in a significant negative aesthetic impact since it will visually appear to be part of the existing medical center development and is not in a prominent, elevated position. While the proposed helipad will create a small incremental visible change in the urban environment, the proposed location of the helipad, which is predominantly screened from major roadways and adjacent residential areas by buildings, trees, and walls,

Photo 1. Looking north from Giannini Drive near Carlysle Avenue. The proposed helipad would be located adjacent to the four-story building (under construction) to the left.

Photo 2. Looking northeast towards the proposed helipad site from Hubbard Avenue. The existing trees would screen the helipad from view. The landing beacon and lights on the roof of the adjacent four-story hospital building could be visible when lit.

would not substantially degrade the existing visual character or quality of the site or substantially alter any existing views of scenic vistas or resources.

- **Construction of the proposed helipad would not substantially degrade the existing visual character or quality of the site or substantially alter any existing views of scenic vistas or resources. (Less Than Significant Impact)**

New Sources of Light or Glare

The proposed helipad will be constructed of non-reflective materials and would not be a source of glare.

A helipad beacon, a lighted windcone, perimeter lights, and building obstruction lights would be installed at and adjacent to the proposed helipad in conformance with FAA and State of California recommendations and requirements for heliports. The landing beacon would be turned on as a helicopter approaches the hospital and lights at the helipad will be turned on at night once the air ambulance lands and until it departs. The locations of these lights are shown on Figure 5 and Figure 7. The following lighting would be activated only when a helicopter is approaching the landing pad at night. These include:

1. Helipad Beacon. A three-color (green-white-yellow) helipad beacon located on the elevator penthouse at the highest point on the building (refer to Figure 7). The three lights (500-watts each) in the helipad beacon will flash in sequence. The beacon would installed just beneath the parapet lip so that the parapet would shield it from homes below while remaining visible to pilots in the air, who would be above its elevation. The beacon visually locates the hospital for an approaching pilot.

2. Lighted Windcone. A lighted windcone would be located at grade, approximately 80 feet southwest of the landing pad center. Its primary lighting would consist of four downward directed 50-watt floodlights that would light the windsock from above regardless of which quadrant it is in. It would also have one 69-watt red obstruction light at the top of its mast. The lighted windcone will provide pilots with a visual indicator of wind direction and speed prior to landing or taking off.

3. Perimeter Lights. Eight flush-mounted yellow perimeter lights (69 watts each) that would outline the landing pad from the air for an approaching pilot (refer to Figure 5). The helipad deck itself (approximately 17 feet above grade) would effectively shield these lights from nearby residences.

4. Building Obstruction Lights. Two 69-watt red obstruction lights, one each at the southeastern and southwestern top corners of the hospital building, will be installed to mark the building's location for pilots landing and taking off at night (refer to Figure 7). These are similar to the red obstruction lights that can be seen at night on top of many buildings near Norman Y. Mineta San José International Airport, except that they would be turned on only when needed for helicopter operations.

The lights described above would be activated only for the occasional nighttime landing or takeoff. All helipad-related lighting would be needed only for those times when a helicopter

is using the facility. While some lights (i.e., building obstruction lights) may be minimally visible from nearby residences and other land uses, they would be activated only for a short time from shortly before a helicopter's arrival until shortly after its departure. The helicopters would be equipped with normal aircraft lights which include low intensity red lights on the left side and green lights on the right side. A landing light, which is a relatively bright white light in front of the helicopter, would be used to light the helipad during approaches.[29] This light would be directed towards the helipad along a flight path parallel to the closest row of homes along the southern property line and would not spillover into residences.

In addition to the lighting described above, which is specific to helicopter flight operations, there would be some exterior lighting to facilitate safe transport of patients between the hospital and helicopter at night. This would consist of flood lights mounted to the side of the hospital building or foot lights along the walkway between the hospital and helipad deck surface. This lighting would be on for even shorter times, activated after the helicopter lands and turned off prior to its departure and would be directed to the specific areas where needed. Floodlights would be oriented to avoid offsite light spillover onto residential properties.

The southern edge of the helipad is set back approximately 285 feet from the closest residential property line; therefore, light spillover onto residential properties will not occur. While landing lights may be visible for short periods during occasional nighttime landings, they will not constitute an adverse light impact.

- **Due to the limited operation of lighting for helicopter landings and departures during nighttime hours and the separation distance and orientation of proposed lighting fixtures, lighting of the proposed helipad would not result in an adverse light impact to nearby residential uses. (Less Than Significant Impact)**

3. Conclusion

The proposed project will not substantially degrade the existing visual character or quality of the site and its surroundings or result in new substantial sources of light or glare. **(Less Than Significant Impact)**

[29] Helicopters used by public safety departments may be fitted with very intense lights used for tracking suspects. The landing lights on emergency ambulance helicopters are not the same as the custom-fitted intense light used on law enforcement helicopters.